Cavitator®
Ultrasonic Cleaners
Instruction Manual

METTLER ELECTRONICS® corp.

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FCC Frequency Interference Statement

Warning:

This equipment generates and uses radio frequency energy, and if not installed and operated in strict accordance with the manufacturer's instructions, may cause radio frequency interference.

Notice 1:

This equipment has been verified to comply with the specifications in Part 18 of FCC Rules, which are designed to provide reasonable protection against radio frequency interference. However, there is no guarantee that interference will not occur in a particular installation.

Notice 2:

If this equipment is found to be the source of radio frequency interference, which can be determined by turning the equipment off and on, the user should try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna (as applicable).
- Relocate the Cavitator with respect to the receiver.
- Move the Cavitator away from the receiver.
- Plug the Cavitator into a different outlet than the receiver.
- If necessary, the user should consult with the dealer or manufacturer for additional suggestions. (The user may find FCC's "Interference Handbook" helpful. It is available from the U.S. Government Printing Office, Washington, D.C. 20402, Stock No. 004–000–00450–7.)

Notice 3:

The manufacturer is not responsible for any interference caused by unauthorized modification to this equipment.

Mettler Electronics Corp., 1333 S. Claudina St., Anaheim, CA 92805
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Section 1: Introduction

1.1 Introduction to Cavitator Ultrasonic Cleaners

Instead of a few hundred brush–bristles scratching the surface here and there, ultrasound creates millions of microscopic bubbles that dislodge contamination and foreign matter, even from blind holes, tight joints, pores and places that cannot be reached by laborious soaking and/or scrubbing. Ultrasound produces these tiny cleaning bubbles by a process called cavitation.

Now, using your new Cavitator ultrasonic cleaner, you can take full advantage of that remarkable ultrasonic action called cavitation which gets items cleaner with less effort and time than the next best method: the scrub brush. You now have the energy to reach and clean even the tightest hidden corners between close–fitting parts that are otherwise impossible to clean. You can now loosen even strongly adherent foreign particles and rinse them away in seconds.

Figure 1.1—The Cavitator Family of Ultrasonic Cleaners

1.2 Introduction to This Manual

Read the contents of this manual prior to using your new Cavitator ultrasonic cleaner.

This manual has been written to assist you with the safe operation of the Cavitator ultrasonic cleaner. It is intended for use by the owners and operators of the Cavitator ultrasonic cleaner. The goal of this manual is to direct the correct operation and maintenance of this unit.

The specifications and instructions presented in this manual are in effect at the time of its publication. These instructions may be updated at any time at the discretion of the manufacturer. Please return the self–addressed, postage–paid Warranty Registration Card, so that you can be notified about improvements to this manual.

1.3 Safety Precautions and Service Information

This Cavitator ultrasonic cleaner operates with high voltages. Servicing of this cleaner should be performed by qualified service technicians or it should be returned directly to the factory. To maximize safety during use, the unit should be plugged into a grounded wall outlet of proper voltage only.

Service may be obtained from the manufacturer by sending the Cavitator ultrasonic cleaner in its original shipping container to: Mettler Electronics Corp., 1333 South Claudina Street, Anaheim, CA 92805, ATTN: Service Department. Telephone toll free: (800) 854–9305. For prompt and efficient service, provide date of purchase, model and serial number of the cleaner and a brief description of the problem.

NOTE: All warranty repairs must be performed by Mettler Electronics Corp. or by a service facility authorized by Mettler Electronics to perform warranty repair work.

In cases where units have exceeded the warranty period, estimates of repairs to be made will be provided at the customer's request. Shipping charges to and from the factory must be paid by the owner, and return method of shipping should be indicated.

A parts list and set of schematics for your Cavitator ultrasonic cleaner is available from Mettler Electronics Corp. at no charge.

1.4 Shipping Damage

Your new Cavitator ultrasonic cleaner is shipped complete in one carton. Upon receipt, please inspect the carton and the unit for visible and hidden damage. If any damage is discovered, hold all shipping materials, including the carton, and call the shipping agent who delivered the unit. The shipping agent is responsible for all damage in transit; therefore, all claims should be filed directly with the agent. The factory will not be responsible for any damage in shipment, nor allow any adjustments unless proper formal claim has been filed by the receiver against the carrier.

The carton in which your new Cavitator ultrasonic cleaner was received is specially designed to protect the unit during shipping. Please retain all shipping materials in the event that you will need to return your unit for servicing.

1.5 Package Contents

Your new Cavitator ultrasonic cleaner comes complete with all the necessary components to perform ultrasonic cleaning. Please note, all Cavitator ultrasonic cleaners are shipped with an instruction manual, warranty card and one sample each of Cavi–Clean detergent and Cavi–Clean additive.

Listed below are additional items that are included in the shipping carton with selected Cavitator models.

ME 5.5S	**ME 18**
• Fill hose, #1159	• Drain valve and hose bib, (1", *2.54 cm*)
• Cleaning basket, #1055	• Cleaning basket # 1059
	• Fill hose, # 1159

1.6 Limited Warranty

This Cavitator Ultrasonic Cleaner is warranted against defects in materials and workmanship for a period of one year from date of purchase. During the applicable warranty period Mettler Electronics Corp. will, at its discretion, either repair or replace the Product without charge for these types of defects.

For service under this warranty, the Product must be returned by the buyer within the applicable warranty period to Mettler Electronics Corp. **Shipping charges to Mettler Electronics Corp. under this warranty must be paid by the buyer. The buyer must also include a copy of the sales receipt or other proof of the date of purchase. If the Product is returned without proof of the date of purchase, it will be serviced as an out–of–warranty product at Mettler Electronics Corp.'s prevailing service rates.**

Alteration, misuse, or neglect of the Product voids this warranty. Except as specifically set forth above, Mettler Electronics Corp. makes no warranties, express or implied, including without limitation any implied warranty of merchantability or fitness for a particular purpose, with respect to the Product. If any implied warranties apply as a matter of law, they are limited in duration to one year.

Mettler Electronics Corp. shall not be liable for any indirect, special, consequential or incidental damages resulting from any defect in or use of the Product.

Any legal action brought by the buyer relating to this warranty must be commenced within one year from the date any claim arises and must be brought only in the state or federal courts located in Orange County, California.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to the buyer. This warranty gives the buyer specific legal rights, and the buyer may also have other rights which vary from state to state.

Section 2—Operation Instructions

2.1 Precautions

Before you operate you Cavitator ultrasonic cleaner, please review the following precautions.

1. *Ground The Unit*—Grounding the unit is very important. If not grounded, a strong alternating current tingling sensation may be encountered by the operator. For added safety, all electrical equipment must be grounded.
2. *Three–Prong Plug*—Each cleaner is equipped with an 8 foot *(2.4 m)* UL approved line cord with a three–prong plug to provide grounding for the cleaner. Do not use an adapter to defeat the safety features of this plug.
3. *Submersion Of Hands In Tank*—Although no physiological harm from ultrasonic energy at these frequencies has been reported, submersion of hands in the tank during operation is not recommended.
4. *Do Not Use Acids*—Do not use acids in the cleaning tank, or place the tank so that ventilation is inhibited. This will prevent undesirable effects during the cleaning operation.
5. *Do Not Use Flammable Liquids*—Ultrasonics may enhance the outgassing of flammable liquids, increasing the chance of ignition.
6. *Electric Shock Hazard*—Dangerous voltages are present behind the protective covering. Refer servicing to qualified personnel.
7. *Cleaning Versus Disinfection*—Ultrasound does not sterilize or disinfect objects contaminated with biological materials.
8. *Chlorine Solutions*—Chlorine solutions such as chlorine bleach cause corrosive damage to stainless steel tanks. Do not use chlorine based cleaners.

2.2 Operating Procedures

1. Fill the tank with enough water or suitable solvent to cover the parts. (The unit operates efficiently at any liquid level from one inch to full.)
2. Plug the unit into a grounded AC outlet.
3. Each time the water is changed, add detergent and run the cleaner for five minutes to drive out the air that is dissolved in the water which could interfere with the ultrasonic action.
4. Rinse away excessive loose foreign material before placing parts in the tank. (The spray–rinse attachment, # 510, is designed specifically for this purpose.) This allows the liquid in the tank to stay cleaner for longer usage.
5. Turn the timer/switch to the desired time (1 to 15 minutes) and cleaning will start immediately as evidenced by the "hissing" sound coming from the tank. (NOTE: the presence of this "hissing" sound is important. It is a sign that your unit is properly cavitating to produce efficient cleaning bubbles.)
6. After the time set on the timer has elapsed, the cleaner will automatically turn off.
7. Since the cleaners are completely self–tuned and are pre–set and tested at the factory, no adjustments are necessary.

2.3 Choosing A Cleaning Solution

1. Selection of a proper detergent is important because some detergents inhibit ultrasonic action and attack the stainless steel tank. To enhance cleaning, use Cavi–Clean for most cleaning needs. Cavi–Clean is an all–purpose concentrated detergent formulated especially to increase the cleaning efficiency of your ultrasonic cleaner. It is gentle to the hands and has a neutral pH. It will not harm metals or their alloys. Blood cutting agents, a rust inhibitor, and an excellent wetting and penetrating agent are among its features.

Cavi–Clean

2. Use approximately 1 part Cavi–Clean in 100 parts of water, 1 or 2 ounces *(30–60 ml)* per gallon *(3.8 liters)*.
3. The choice of cleaning solutions depends upon the nature of the soil and the material to be cleaned. Most solvents and all aqueous solutions will support cavitation at the desirable, powerful low frequencies generated by Cavitator ultrasonic cleaners.
4. Use Cavi–Clean additive to increase cleaning action to remove metal oxides, stains and to loosen plaster. Important: use only as an additive to Cavi–Clean detergent because its use with certain other detergents might cause damage to the cleaning tank or the parts being cleaned.

   Add 1 to 3 teaspoons *(0.4 to 1.1 cc per liter)* Cavi–Clean additive per gallon *(3.8 liters)* of water with Cavi–Clean detergent.

   Caution: Repeated usage might remove plating from plated parts and damage stainless steel instruments. Ultrasonic tank damage can be avoided by cleaning in a supplementary glass container *(See "Cleaning in Beakers" below)*. Extra precautions should be utilized with dissimilar metals. Use only when necessary because Cavi–Clean detergent will meet most cleaning requirements.
5. While certain solvents will not support direct cavitation at these preferred frequencies, more than ample power for effective cleaning is transmitted through the metal parts, provided they rest on the bottom of the cleaning tank.
6. Remember: Do not use acid or chlorine solutions *such as chlorine bleach* in the cleaning tank.

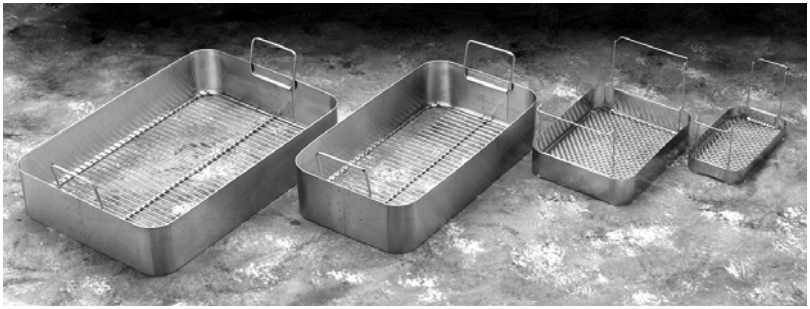
2.4 Cleaning In Beakers

Many acid solutions and strong solvents may be successfully used by cleaning in auxiliary beakers. The beakers containing the special cleaning solutions can rest at the bottom of the main cleaning tank. Enough water containing detergent should be maintained so that the beakers are in at least one inch of water. These glass beakers may be purchased at any laboratory supply company. Do not use plastic containers for cleaning in your ultrasonic cleaner.

Section 3—Specifications

Model—	Line Current— volts, (Hz)	Tank Dimensions— Inches (cm)	Overall Dimensions— Inches (cm)
2.1	105/120 (50/60)	$9\,^{3}/_{8}$ x $5\,^{3}/_{8}$ x $2\,^{5}/_{16}$ (23.8 x 13.7 x 5.9)	$10\,^{3}/_{8}$ x $6\,^{3}/_{8}$ x $5\,^{11}/_{16}$ (26.4 x 16 x 14.4)
4.6	105/120 (50/60)	$9\,^{3}/_{8}$ x $5\,^{3}/_{8}$ x 6 (23.8 x 13.7 x 15.2)	$10\,^{3}/_{8}$ x $6\,^{3}/_{8}$ x $9\,^{1}/_{8}$ (26.4 x 16.2 x 23.2)
5.5S	105/120 (50/60)	$19\,^{1}/_{2}$ x $11\,^{1}/_{2}$ x 6 (49.5 x 29.2 x 15.2)	$21\,^{1}/_{2}$ x $13\,^{1}/_{2}$ x $11\,^{1}/_{4}$ (54.6 x 34.3 x 28.6)
18	105/120 (50/60)	$21\,^{3}/_{4}$ x $15\,^{3}/_{4}$ x 12 (55.2 x 40 x 30.5)	$23\,^{3}/_{4}$ x $17\,^{3}/_{4}$ x 31 (60.3 x 45.1 x 78.7) —*Height Adjustable*

Model—	Tank Capacity— (Liters)	Shipping Weight— Pounds (kg)	Power— Watts	Nominal Main Frequency— kHz	Fuse— amperes
2.1	2.1 quarts (2)	8 (3.6)	85	67	2
4.6	4.6 quarts (4.3)	9 (4.1)	85	67	2
5.5S	5.5 gallons (20.8)	35 (15.9)	200	67	2 Slo Blo
18	18 gallons (68)	130 (59.1)	800	24	10



Stainless Steel Cleaning Baskets (#1011(NA), 1055, 1058 and 1059)

Stainless Steel Covers (#1012(NA), 1025 and 1038)

Spray Rinse Attachment (#510)

Section 4—Accessories

4.1 Ordering Information:

Cavitator ultrasound cleaning products and accessories are available from Mettler Electronics authorized distributors. For information regarding either Mettler products or a distributor near you, please call toll free, (800) 854–9305 or phone (714) 533–2221 in areas outside the continental United States. Ask for Customer Service. Mettler Electronics is open from 7 AM until 5 PM Pacific Time for your convenience.:

4.2 Cavitator Ultrasonic Cleaner Accessories

Catalogue #	Item Description
1025	Stainless steel cover—for models ME 2.1 and ME 4.6
1038	Stainless steel cover—for model ME 5.5S
1055	Extra stainless steel cleaning basket 4" (10.2 cm) deep—for model ME 5.5S
1058	Stainless steel cleaning basket 1" (2.54 cm) deep—for models ME 2.1 and ME 4.6
1059	Stainless steel cleaning basket 4" (10.2 cm) deep—for model ME 18
1159	Extra 5' (1.5 m) long fill hose
510	Spray Rinse Attachment

4.3 Cavi–Clean Liquid Detergent and Additive

Catalogue #	Item Description
1812	Cavi–Clean ultrasonic cleaning detergent, case of four, one gallon containers
1816	Cavi–Clean ultrasonic cleaning additive, case of six, one pound bags